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Performance of Hissar cattle (*Bos indicus*) in the Dry Tropics of Sumbawa, Eastern Indonesia

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Introduction

In 1920, the Dutch introduced 202 (15 males, 138 females, and 49 calves) Hissar cattle (*Bos indicus*) from Punjab India into Sumbawa island to be used as draught animals. Since then, Sumbawa island was designated as the centre for purification of Hissar cattle. Hissar cattle in Sumbawa is characterized by longer horns of females than males, white or dark grey coat, good temperament, and large withers with hump. By 1938, population of Hissar cattle declined to only 8 (2 intact bulls, 2 castrated bulls, 2 cows and 2 calves). They were the germplasm from which the current Hissar cattle which have been well adapted to the dry tropics of Sumbawa (Dilaga, 2014).

Based on information from the key farmers the highest number of Hissar cattle occurred in 1960-1970 but there was no official data available. In 1976/1977 the government introduced Bali cattle to Sumbawa to purify this cattle breed and to increase Bali cattle population in Indonesia (Sudradjat and Pambudy, 2003). To successfully implement the Bali cattle purification program, Hissar cattle which have been in the island for 56 years should be eliminated. However, farmers raised Hissar cattle illegally because they really like this cattle breed. Hissar cattle have good temperament and tolerant to diseases.

Based on the Decree of Ministry of Agriculture Republic of Indonesia no: TN 220/18/A/0299 dated 7 February 1999, the national government declared Penyaring Village in the northern part of Sumbawa island, as the region for Hissar cattle development. This period was the starting point of the rapid growth of Hissar cattle population in Sumbawa. Due to the rapid increase in population of Hissar cattle, the Indonesian government declared Hissar cattle as the local germplasm and called "Sumbawa cattle" (decree of Ministry of Agriculture Republic of Indonesia no: 2909/Kpts/OT.140/1/2011, dated 17 June 2011). Since then, Hissar cattle in Indonesia are known as "Sumbawa cattle".

By 2015, population of Hissar cattle in Sumbawa reached 10,541 and scatter all across Sumbawa Island. The highest population occurred in Sumbawa district (6,763) and 70% of the Hissar cattle in this district are raised by farmers in Penyaring village (Anonymous, 2015). Hissar cattle are now known as dual purpose cattle to produce beef and milk and have not been studied intensively.

Performance of Hissar cattle in Sumbawa

Adaptation ability to harsh environment

Hissar cattle are able to grow well and have quite high milk production under the humid tropics of Sumbawa probably because they have white skin that can reflect ultraviolet light from the sun. The large hump enables them to adapt to low quality diets as the hump functions as the fat store. According to Sutardi (1981) when an animal does not eat, the energy demand is met from oxidation of body fat. In addition to energy, fat metabolism also results in metabolic water, therefore Hissar cattle are efficient in using water in the dry areas (Dilaga, 2014). Husnainy (2005) reported that Hissar cattle consume smaller amount of water (159 ml/kg B^{0.75}/day) than FH cross (268 ml/kg B^{0.75}/day) and Bali cattle (332 ml/kg B^{0.75}/hari).

Growth and beef production

Hissar cattle are mostly raised in semi extensive system. They are allowed to graze night and day on communal grazing land and collected only when they are registered or to be sold. Consequently their growth rate is slow (0.5 kg/day in average). Growing Hissar bulls supplementation with 1 kg rice bran per head per day before grazing increased the growth rate to 0.7 kg/day (Dilaga et. al., 2002).

Supplementation of cows during late pregnancy with 1 kg fresh leucaena per day increased birth weight from

22.83±2.40 kg to 24.67±1.63 kg (Dilaga, et. al., 2015). Results of an ongoing experiment, growth rate of weaned male Hissar cattle supplemented with leucaena at 1% dry matter of body grew at 0.4 kg/day compared to the ones fed 100% grass growing at 0.1 kg/day. Similar results of leucaena feeding were also reported in other studies. Panjaitan et. al. (2013) reported that Bali bulls fed leucaena as the main component of the diet grew at 0.42±0.12 kg/day, twice the rate of similar bulls fed grass only. Dahlanuddin et. al. (2014) also reported that young Bali bulls fed leucaena as the sole diet grew at 0.47±0.05 kg/day.

The potential of Hissar cattle to produce beef can be compared with other *Bos indicus* breed (Sumba Ongole and Peranakan Ongole (Ongole cross) (Table 1).

Table 1. Average weight and percentage of body parts of medium frame *Bos indicus* (Dilaga, 2014)

No	Items	Hissar	Sumba ongole (SO)	Peranakan ongole (PO)
1.	Warm carcass, kg	125.4	180.0	136.0
2.	Carcass, %	47.5	44.9	45.3
3.	Head, kg	16.0	19.9	15.2
4.	Hide, kg	16.0	26.8	18.4
5.	Legs, kg	6.0	7.5	5.8
6.	Heart and lung, kg	3.3	6.7	3.8
7.	Liver, kg	2.7	5.2	3.3
8.	Spleen, kg	1.5	1.0	0.7
9.	Digestive system, kg	28.0	26.0	15.5

Hissar cattle has higher carcass percentage compared to Sumba Ongole and Peranakan Ongole. This is because Hissar cattle have smaller proportion of hide, head and legs. Under free grazing condition, the slaughter weight of Hissar cattle can reach 450 kg. Recently, farmers cross male Hissar cattle with Bali cows to increase beef production. The birth weight of this Hissar x Bali cross (called Hisbal crossbred) is 18-20 kg and grow faster than Bali cattle (Dilaga, 2014). However, information on ADG, slaughter weight and carcass weight of Hissar x Bali bulls are not available and open for more detailed study.

Milk production

Hissar cattle grazing on native pasture has low milk production. Supplementation of lactating cows (4th lactation) with 1 kg fresh leucaena and 1 kg rice bran, increased milk production from 2.7 ± 0.8 liter/day to 3.9 ± 0.9 liter/day and increase income from milk by IDR 14,000 per litre of milk (Dilaga, et al., 2015). This increased milk production was due to additional protein from leucaena to balance the energy rich rice bran. Tudsri et al. (1998) also reported that milk production of dairy cattle grazing on pasture improved with leucaena and brachiaria grass increased from 11.9 litre per day to 13.6 litre per day. Maasdorp dan Dzewela (1998) also reported that milk production of cows supplemented with leucaena, *Acacia boliviana*, *Calliandra calothyrsus* and grass were 13.6, 11.94, 11.14 and 11.36 litre per day respectively.

Conclusion

Hissar cattle have been well adapted to the humid tropics of Sumbawa. Under traditional rearing system, Hissar cattle bull grow at an average of 0.5 kg/day. Supplementation with energy or protein rich supplements can increase liveweight gain to 0.7 kg/day, and increase milk production from less than 3 litres per day to about 4 litres per day.

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KEYWORD : Hissar cattle, Dry tropics, Productivity

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